

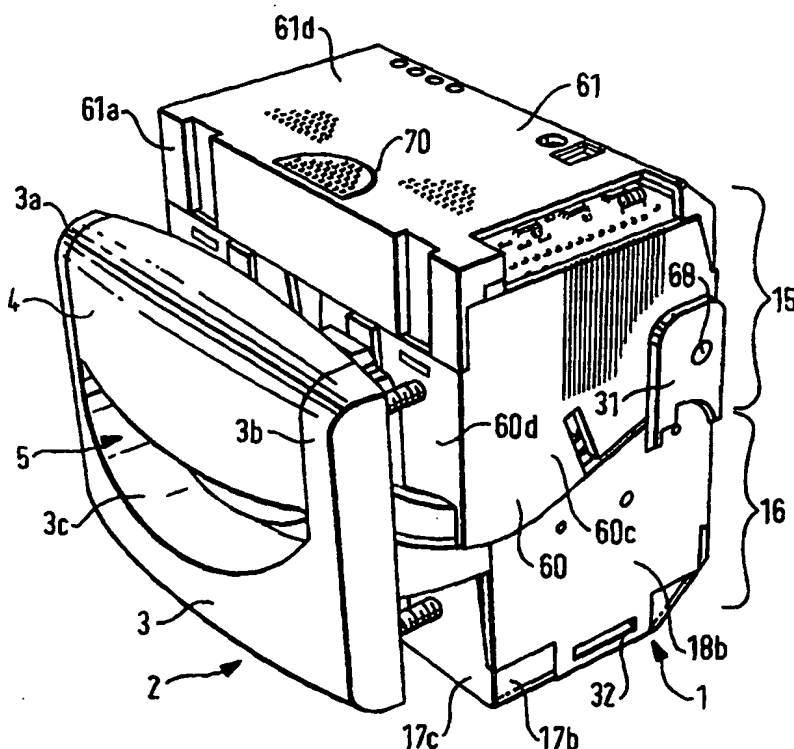


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : G07D 7/00	A1	(11) International Publication Number: WO 99/42959 (43) International Publication Date: 26 August 1999 (26.08.99)
(21) International Application Number: PCT/GB99/00526 (22) International Filing Date: 19 February 1999 (19.02.99) (30) Priority Data: 98301248.5 19 February 1998 (19.02.98) EP (71) Applicant (for all designated States except US): INNOVATIVE TECHNOLOGY LIMITED [GB/GB]; Derker Street, Oldham OL1 4EQ (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): DUNLOP, Peter [GB/GB]; 18 Park Road, Hyde, Cheshire SK14 4JT (GB). ASHURST, Kevin [GB/GB]; 24 Prince Wood Lane, Birkby, Huddersfiels HD2 2DG (GB). (74) Agents: AHMAD, Sheikh, Shakeel et al.; David Keltie Associates, 12 New Fetter Lane, London EC4A 1AG (GB).		(81) Designated States: CN, JP, US. Published <i>With international search report.</i>

(54) Title: BANKNOTE VALIDATOR**(57) Abstract**

A banknote validator includes magnetic and optical sensors (305, 306, 307) and a non-return gate in its banknote path (80). The magnetic sensor (307) comprises a magnetic circuit and an electronic circuit. The magnetic circuit comprises a yoke (402) and two giant magneto-resistors (400, 401) and the electronic circuit comprises a coil (407) arranged to generate a magnetic field in the yoke (402) and first and second feedback control loops. The first loop is responsive to the output of the first giant magneto-resistor (400) to energise the coil (407) so that the giant magneto-resistor operates in a predetermined region of its characteristic. The second loop is responsive to the differential between the giant-magneto-resistor outputs to generate a bias voltage for the second giant-magneto-resistor (401) tending to cause the differential to be zero.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakistan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 99/00526

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 G07D7/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G07D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 881 268 A (UCHIDA SHINYA ET AL) 14 November 1989	10, 11, 13, 14, 16, 19
A	see claim 1; figure 1	12, 15, 17, 18, 20
X	US 5 540 425 A (GRAEF HARRY T ET AL) 30 July 1996	21-23, 26
A	see claim 1; figure 9	1-21, 24, 25, 27
A	US 5 378 885 A (JONES JR ROBERT E ET AL) 3 January 1995 see claim 1; figures 1, 12	1-9
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

6 May 1999

Date of mailing of the international search report

14/05/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Kirsten, K

INTERNATIONAL SEARCH REPORT

Inter. Appl. No.
PCT/GB 99/00526

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 017, no. 563 (P-1628), 12 October 1993 & JP 05 159245 A (SHARP CORP), 25 June 1993 see abstract ---	1-9
A	EP 0 768 643 A (READ RITE CORP) 16 April 1997 see claim 1; figure 3 ---	1-9
A	DE 27 13 396 A (APPLIED PHOTOPHYSICS LTD) 28 September 1978 see claim 1; figure 2 ---	10-20
A	US 4 513 439 A (GORGONE ROBERT L ET AL) 23 April 1985 see claim 1; figure 1 -----	1-27

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inte. .ional Application No

PCT/GB 99/00526

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4881268 A	14-11-1989	JP 62296292 A DE 3719373 A FR 2600191 A GB 2192275 A,B	23-12-1987 23-12-1987 18-12-1987 06-01-1988
US 5540425 A	30-07-1996	US 5422467 A AU 675908 B AU 4207296 A AU 664130 B AU 5314394 A CA 2113588 A DE 69407062 D DE 69407062 T EP 0606959 A ES 2113605 T JP 7049976 A US 5534682 A US 5655644 A	06-06-1995 20-02-1997 04-04-1996 02-11-1995 21-07-1994 16-07-1994 15-01-1998 16-07-1998 20-07-1994 01-05-1998 21-02-1995 09-07-1996 12-08-1997
US 5378885 A	03-01-1995	DE 69224995 D DE 69224995 T EP 0610383 A ES 2113960 T JP 7500940 T WO 9309532 A	07-05-1998 10-12-1998 17-08-1994 16-05-1998 26-01-1995 13-05-1993
EP 0768643 A	16-04-1997	JP 9190613 A	22-07-1997
DE 2713396 A	28-09-1978	NONE	
US 4513439 A	23-04-1985	NONE	



PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 07 33392	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 99/ 00526	International filing date (day/month/year) 19/02/1999	(Earliest) Priority Date (day/month/year) 19/02/1998
Applicant INNOVATIVE TECHNOLOGY LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

1



None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/GB 99/ 00526

Box III TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

The abstract is shortened to permits Rule 8.1(b) PCT.
Line 12-21 has been deleted.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 99/00526

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 G07D7/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G07D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 881 268 A (UCHIDA SHINYA ET AL) 14 November 1989	10,11, 13,14, 16,19
A	see claim 1; figure 1	12,15, 17,18,20
X	US 5 540 425 A (GRAEF HARRY T ET AL) 30 July 1996	21-23,26
A	see claim 1; figure 9	1-21,24, 25,27
A	US 5 378 885 A (JONES JR ROBERT E ET AL) 3 January 1995 see claim 1; figures 1,12	1-9
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

6 May 1999

Date of mailing of the international search report

14/05/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Kirsten, K

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 99/00526

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 017, no. 563 (P-1628), 12 October 1993 & JP 05 159245 A (SHARP CORP), 25 June 1993 see abstract ---	1-9
A	EP 0 768 643 A (READ RITE CORP) 16 April 1997 see claim 1; figure 3 ---	1-9
A	DE 27 13 396 A (APPLIED PHOTOPHYSICS LTD) 28 September 1978 see claim 1; figure 2 ---	10-20
A	US 4 513 439 A (GORGONE ROBERT L ET AL) 23 April 1985 see claim 1; figure 1 -----	1-27

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/00526

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4881268	A	14-11-1989	JP 62296292 A DE 3719373 A FR 2600191 A GB 2192275 A, B	23-12-1987 23-12-1987 18-12-1987 06-01-1988
US 5540425	A	30-07-1996	US 5422467 A AU 675908 B AU 4207296 A AU 664130 B AU 5314394 A CA 2113588 A DE 69407062 D DE 69407062 T EP 0606959 A ES 2113605 T JP 7049976 A US 5534682 A US 5655644 A	06-06-1995 20-02-1997 04-04-1996 02-11-1995 21-07-1994 16-07-1994 15-01-1998 16-07-1998 20-07-1994 01-05-1998 21-02-1995 09-07-1996 12-08-1997
US 5378885	A	03-01-1995	DE 69224995 D DE 69224995 T EP 0610383 A ES 2113960 T JP 7500940 T WO 9309532 A	07-05-1998 10-12-1998 17-08-1994 16-05-1998 26-01-1995 13-05-1993
EP 0768643	A	16-04-1997	JP 9190613 A	22-07-1997
DE 2713396	A	28-09-1978	NONE	
US 4513439	A	23-04-1985	NONE	